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DRABA INCANA AND ITS ALLIES IN NORTH- EASTERN AMERICA.

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(Plate 60.)

RECENT collections of the *Draba incana* group, especially those from the Gaspé Peninsula in Quebec, have shown clearly that former treatments have not fully covered the eastern North American material, which has heretofore been mostly referred to *D. incana*, L., and *D. arabisans*, Michx. A careful study of *D. incana*, as interpreted by Koch¹ and other European authors, shows that this plant is not represented in the eastern United States. True *D. incana* is clearly marked by the margins of the basal leaves, which are hirsute-ciliate with long simple hairs. It is mostly a simple, very leafy plant, with few basal rosettes, densely pilose-hirsute leaves, and sessile or subsessile stigmas. This is the common plant of northern Europe, Iceland and Greenland. On this continent it is found in Labrador, Newfoundland, eastern Quebec (Percé), and one specimen has been seen from Bathurst, New Brunswick. It is therefore apparently confined to the northeastern coast, and is scarcely to be expected inland or southward. A form with pubescent siliques seems to have the same range both here and in Europe, and is referred to var. *confusa* of Poiret. This is the var. *hebecarpa* of Lindblom and the *D. confusa* of Ehrhart, as Lindblom has clearly shown.²

D. arabisans of Michaux is a very distinct American species of definite range. It is a tall, rather slender, branching plant, with

¹ Koch, Syn. ed. 2, i. 70 (1843). ² Lindblom, Linnaea, xiii, 332 (1839).

matted rosettes at the base, thin, slightly pubescent green leaves, and smooth, narrow, much twisted siliques, terminated by a very distinct style. This is the familiar smooth-podded plant of northern Vermont and northern New York. Its range is the St. Lawrence valley, from the Great Lakes to the Gulf, with occasional stations in Vermont and central Maine. *D. glabella*, Pursh, from Hudson Bay, is referred to this species by Torrey and others. Material of this has not been seen, nor has any from the Hudson Bay region been accessible, so it cannot be stated definitely what the name stands for. It is referred tentatively to the first variety described below. Another plant mentioned by Torrey & Gray,¹ as *D. arabisans* β (*D. Longii*, Schwein. in herb.) from Lake Superior, is somewhat obscure, but apparently is merely a short-styled extreme. The first variety of *D. arabisans* described below is a constant form occurring frequently in Labrador, the Gaspé Peninsula, and adjacent Quebec and northern New Brunswick. It is clearly marked by smaller size and shorter, not twisted siliques. To this species, *D. arabisans*, also is referred the local *D. canadensis*, Brunet, a plant with very short ovate siliques, known from a single station only on the northern shore of the lower St. Lawrence.

The American plant with pubescent siliques which has passed for *D. incana* in Gray's Manual and other works, is a species of wide distribution, for it is found in northern Asia, alpine Europe, and at different stations in eastern North America as well as in the Rocky Mountains. It has been called by various names, but as Koch plainly demonstrates,² it is properly the *D. stylaris* of Gay, not *D. confusa* of Ehrhart, to which it is often referred. This plant is clearly separated from *D. incana* by the canescent pannose-stellate pubescence of the leaves, which entirely lack the longer simple hairs of that species. It is much less leafy, and the silique is tipped by a distinct style. Schlechtendal has described a Labrador plant as *D. Henneana*, which seems from his description to be identical with *D. stylaris*.

A peculiar plant was collected in 1902 by E. F. Williams and M. L. Fernald at Paspébiac, Quebec, where it covered an extensive gravelly beach. It is coarse and scabrous, with elliptic siliques and very large seeds, 1.33 to 1.5 mm. long. The plant is strikingly

¹ Fl. N. Am. i. 106 (1838). ² Koch, Syn. ed. 2, i. 70 (1843).

different from other eastern members of the group but it seems to be a very close relative of *D. borealis* of the Behring Sea region. From that northwestern species it differs in several clear characters and it is here given specific rank.

On the exposed limestone cliffs about Percé, at the tip of the Gaspé Peninsula, is a species with cuneate basal leaves, and a very peculiar short oblong silique. This is crowded with seeds, which overlap so closely as to produce angulate edges. The funiculus is very short, while in the other species here discussed it is half as long as the seed. This plant is so clearly marked that it also seems justly entitled to specific rank.

There are numerous references to *Draba incana* throughout American literature, but it has been impossible clearly to identify many of them. In the present treatment are cited only specimens actually seen; and the species are illustrated by detailed figures prepared by Mr. F. Schuyler Mathews.

* Margins of basal leaves hirsute-ciliate with long simple hairs.

D. INCANA, L. (Figs. 1, 2.) Biennial, or perennial by scattered offshoots, caudex sub-simple: flowering stems usually single, occasionally 2 to 5, very leafy, 0.4–4 dm. high, densely pilose-hirsute: basal rosettes few; their leaves oblanceolate, subentire to sparsely sharp-dentate, 0.5–2.5 cm. long, green, loosely pubescent with simple and more or less stellate hairs; cauline leaves lanceolate to narrowly ovate, dentate, 0.5–2 cm. long, pubescence as in basal leaves: racemes comparatively dense; pedicels pilose-hirsute, in fruit mostly becoming 1.5–3 mm. long (lowest rarely 1 cm. long): siliques appressed-ascending, oblong, flat or slightly contorted, acutish, 7–10 mm. long, 2–3.5 mm. broad; stigmas sessile or sub-sessile; valves glabrous: seeds not crowded, 0.9–1.4, average 1.08 mm. long.—Sp. 643, in part (1753); Reich., Ic. Crit. viii. t. 769 (1830); Reich., Ic. Fl. Germ. ii. t. 14, fig. 4249 (1837); Hook., Trans. Linn. Soc. xxiii. 317 (1861); Watson in Gray, Syn. Fl. i, pt. 1. 111, in part (1895). *D. contorta*, Ehrh., Beitr. vii. 155 (1792); DC., Syst. ii. 348 (1821). *D. incana*, α , Hook., Fl. Bor.-Am. i. 55 (1830); Torr. & Gray, Fl., 107 (1838). *D. incana*, α *legitima*, Lindblom, Linnaea, xiii. 331 (1839); Koch, Syn. Ed. 2, i. 70 (1843). *D. incana*, γ *diffusa*, Lindblom, l. c. (1839).—Northern Europe, Iceland and Greenland: LABRADOR, Rigoulette, Aug. 25, 1891 (*Bowdoin Coll. Ex.*, no. 269);

July 13, 1892 (*J. D. Sornborger*, no. 70): NEWFOUNDLAND, cliffs, Notre Dame Bay, July 2, 1894 (*A. C. Waghorne*); Barred Islands, August 12, 1903 (*J. D. Sornborger*): QUEBEC, crests of calcareous sea cliffs, Cap Blanc, Percé, Aug. 17, 1904 (*Collins, Fernald & Pease*): NEW BRUNSWICK, near Bathurst, July, 1881 (*C. Lindon*).

Var. CONFUSA, Poir. Siliques pubescent.—Suppl. ii. 524 (1811). *D. incana*, L., Sp. 643, in part (1753). *D. confusa*, Ehrh., Beitr. vii. 155 (1792); DC., Syst. ii. 348, in part (1821). *D. incana*, β *confusa*, Torr. & Gray, Fl. 107 (1838). *D. incana*, var. *hebecarpa*, Lindbl., Linnaea xiii. 331 (1839); Koch, Syn. Ed. 2, i. 70 (1843).—General range of the species, but occurring in separate colonies: LABRADOR, Okkak (*Fratres Moravi*); on a roof, Fox Harbor, Aug. 13, 1882 (*J. A. Allen*, No. 76): QUEBEC, shore, Salt Lake, Anticosti, Aug. 11, 1883 (*J. Macoun*, No. 19); limestone detritus, crest of Cap Barré, Percé, Aug. 16, 1904 (*Collins, Fernald & Pease*).

* * Basal leaves uniformly stellate-pubescent, not ciliate above the petiolar base.

+ Siliques pubescent, at least when young.

+ + Mature seeds 0.70–0.95 mm. long.

D. STYLARIS, Gay. (Figs. 3–5.) Biennial or perennial, with simple or slightly branching caudex: flowering stems 1 to 6, simple or slightly branching, pilose, 1–3.5 dm. high, remotely leafy: basal rosettes few; their leaves crowded, oblanceolate, remotely dentate, 1–4 cm. long, canescent with soft stellate tomentum; cauline leaves 3–10, ovate to oblong, usually dentate, 0.5–3 cm. long, their pubescence scantier than in the basal leaves: racemes loose; pedicels sub-ascending, in fruit becoming 2–5 mm. long: siliques narrowly oblong to lanceolate, frequently twisted, acutish, 7–12 mm. long, 1.25–2.25 mm. wide; stigmas usually definite; valves stellate-canescant: seeds not crowded.—Gay in Thomas, Cat. (1818) fide Koch Syn. Ed. 2, i. 70 (1843). *D. confusa* Reich., Ic. Crit. viii. 1033 (1830), and Ic. Fl. Germ. ii. t. 14, fig. 4248 (1837), and various European authors; not Ehrhart. *D. Henneana*, Schlecht., Linnaea, x. 100 (1836). *D. Thomasii*, Koch, Syn. Ed. 2, i. 438 (1843). *D. incana*, Gray, Man. Ed. 5, 71 (1867); Watson in Gray, Syn. Fl. i. part 1, 111, in part (1895); not L.—Northern Asia, alpine Europe, Greenland: LABRADOR, Ramah, Aug. 15, 1892 (*J. D. Sornborger*, no. 214): NEWFOUNDLAND, high sea cliffs, Chimney Cove, 1896 (*A. C.*

Waghorne): NEW BRUNSWICK, dry rocks, Nashwaak, 1881 (*J. Moser*, Herb. N. B. Nat. Hist. Soc.): VERMONT, dry cliffs, Willoughby Mt. (*Tuckerman, H. Mann, et al.*); dry cliffs, Smuggler's Notch, Mt. Mansfield, Aug. 2, 1893 (*W. W. Eggleston*): COLORADO, South Park, 1873 (*Wolf & Rothrock*, no. 631): ALBERTA, Bow River Pass, Sept. 13, 1879 (*J. Macoun*): BRITISH COLUMBIA, Macleod's Lake, Lat. 55°, June 21, 1875 (*J. Macoun*, no. 157).

++ Mature seeds 1.33–1.5 mm. long.

D. megasperma, n. sp. (Figs. 6–8). Perennial; caudex stout and branching: flowering stems 2 to 25, 1–3 dm. high, simple or loosely branched, scabrous-puberulent with stellate hairs, remotely leafy: basal rosettes numerous; their leaves spatulate, harsh with canescent-stellate hairs, entire or rarely dentate, 1–3 cm. long; cauline leaves, 3 to 10, oblong-ovate, sub-entire, 1–1.5 cm. long, sparingly stellate: racemes loose; pedicels sub-ascending, in fruit becoming 1.5–5 mm. long, glabrate: siliques elliptic, flat or barely twisted, 5–11 mm. long, 3–4 mm. broad, sparingly harsh-stellate, finally glabrate; stigmas sub-sessile: seeds not crowded. — QUEBEC, gravelly beach, Paspébiac Lighthouse, Bonaventure County, July 26, 1902 (*Williams & Fernald*).

Superficially resembling *D. borealis*, DC., of the Behring Sea region, a plant with longer looser pubescence, more elongate fruiting pedicels, and thinner less canescent leaves.

+ + Siliques glabrous from the first.

++ Seeds not crowded, their edges rounded.

D. ARABISANS, Michx. (Fig. 9.) Perennial; caudex branching: flowering stems 1 to 40, simple or loosely branched, 1.5–4.5 dm. high, sparingly pubescent: basal rosettes numerous; their leaves oblanceolate or spatulate, entire or somewhat dentate, thin, green, thinly stellate-pubescent, 1–7 cm. long; cauline leaves 4–13, oblanceolate, serrate-dentate, 1–4.5 cm. long, otherwise like the basal: racemes loose; pedicels divergent, in fruit becoming 4–10 mm. long: siliques elliptic-lanceolate, much twisted, 9–15 mm. long, 1.5–3 mm. wide; style definite: seeds 1–1.5 mm. long. — Fl. Bor.-Am. ii. 28 (1803); DC., Syst. ii. 349 (1821) and Prodr. i. 170 (1824); Torr. & Gray, Fl. N. Am. i. 106 (1838); Torr., Fl. N. Y. i. 62 (1843); Gray, Gen. i. 160, t. 68 (1848) and Man. 39, (1848).

D. Arabis, Pers., Syn. ii. 190 (1807). *D. glabella*, Pursh, Fl. 434 (1814) fide Torr. & Gray, Fl. N. Am. i. 668, and Watson, Bib. Ind. 58. (1878). *D. incana*, var. *arabisans*, Watson, Proc. Am. Acad. xxiii. 260 (1888), in Gray, Man. ed. 6, 67 (1890), and in Gray, Syn. Fl. i. part 1, 111 (1895); Britton & Brown, Ill. Fl. ii. 142 (1897). *D. incana*, var. *glabriuscula*, Gray, Ann. Lyc. Nat. Hist. N. Y. iii. 223 (1835).—An American species described by Michaux from “rupibus ripariis ad lacum Champlain et in Nova Anglia.”—NEWFOUNDLAND, sea cliffs, Bay of Islands, June 24, 1895 (*A. C. Waghorne*); QUEBEC, calcareous cliffs, Mt. Ste. Anne, Percé, Aug. 18, 1904 (*Collins, Fernald & Pease*); rocky bank of the Grand River, Gaspé Co., July, 1903 (*G. H. Richards*), July 2, 1904 (*Fernald*); trap cliffs at 1800–1900 feet, Tracadigash Mt., Carleton, July 24, 1904 (*Collins, Fernald & Pease*); limestone-conglomerate cliffs, Bic, Rimouski Co., July 16–18, 1904 (*Collins & Fernald*); MAINE, Mt. Kineo, Sept., 1887 (*G. G. Kennedy*); Day Mt., Franklin Co., July 24, 1903 (*C. H. Knowlton*), Aug. 31, 1904 (*C. H. Knowlton & E. B. Chamberlain*): VERMONT, Lake Champlain (*Michaux* in Herb. Mus. d’Hist. Nat., Paris); rocky shores and cliffs, Gardner Island, Lake Champlain (*Faxon, et al.*); cliffs of Willoughby Mt. (*Wm. Boott, et al.*); Smuggler’s Notch, Mt. Mansfield (*Faxon, et al.*); Snake Mt., Weybridge, June 30, 1892 (*W. W. Eggleston*) Mt. Eolus, Dorset, September, 1901 (*Mrs. E. H. Terry*): NEW YORK, rocky banks of lakes in St. Lawrence and Jefferson Counties (*A. Gray*); Sacketts Harbor (*W. A. Wood*); Cayuga Lake, June 16, 1885 (*W. R. Dudley*); near Akron, Erie County, 1864 (*G. W. Clinton*): ONTARIO, from Sault Ste. Marie to Michipicoten Bay (*C. G. Loring*).

Var. *orthocarpa*, n. var. (Figs. 10, 11.) Generally lower, 1–3 dm. high: siliques rarely twisted, 5–10 mm. long, 2–4 mm. wide: seeds 0.8–1.25 mm. long.—LABRADOR, without station (*Martin*); Hopedale (*J. Steetz*); base of cliff, Dead Islands, Aug. 20, 1882 (*J. A. Allen*, no. 25): QUEBEC, on shingle, West Point, Anticosti, Sept. 7, 1883 (*J. Macoun*, no. 20); cold cliffs, Grand Coupe, Percé, Aug. 19, 1904; cliffs of Gaspé Bay, Douglastown, Aug. 22, 1904; shaded calcareous cliffs, Little River, Gaspé County, Aug. 16, 1904; trap cliffs at 1800–1900 ft., Tracadigash Mt., Carleton, July 24, 1904 (*Collins, Fernald & Pease*); limestone-conglomerate cliffs, Bic, Rimouski County (TYPE) July 15–18, 1904 (*Collins & Fernald*): NEW BRUNSWICK, Restigouche River, July 28, 1888 (*J. Brittain*); rocks, Kennebec-

asis Island, June 12, 1886 (*J. E. Wetmore*): VERMONT, Willoughby Mt., July 28, 1885 (*W. Deane*).—This is *Arabis petraea* of Fowler's List of Plants of New Brunswick (Nat. Hist. Soc. N. B. Bull. no. 4, 15, 1885), and it is possibly *D. glabella*, Pursh, referred to *D. arabisans* by Torrey & Gray, and others. One individual from Tracadigash Mt. has the siliques acutely triquetrous, with three valves and two false partitions.

Var. **canadensis**, n. comb. (Fig. 12.) Low, 1–1.5 dm. high: siliques elliptic-ovate, 5–7 mm. long, 3–4 mm. broad. *D. canadensis*, Brunet, Cat. Plantes Can. 21 (1865).—QUEBEC, crevices of rocks, St. Joachim, Cap Tourmente, 1864 (*Ovide Brunet*).

++ ++ Seeds closely crowded, angulate.

D. pycnosperma, n. sp. (Figs. 13–15.) Perennial; caudex freely branching: flowering stems, 1 to 30, mostly simple, 0.5–2.5 dm. high, loosely pilose: basal rosettes very numerous, their leaves cuneate-spatulate, sparingly dentate above the middle, 0.7–3 cm. long, closely stellate-pubescent; cauline leaves 2 to 4, oblong, 0.5–1.5 cm. long: racemes short and loose, in maturity 1.5–8 cm. long; pedicels slightly spreading, 2–6 mm. long, glabrate: siliques plump, compressed, oblong to short-ovoid, 2.5–6 mm. long, 1.5–2.5 mm. broad; style very short but definite: funiculus very short: seeds, 0.9–1.2 mm. long, closely crowded and overlapping, angulate.—QUEBEC, Percé, crests of calcareous sea cliffs, Cap Blanc, Aug. 17, 1904; Cap Barré, Aug. 16, 1904; limestone ledges, Le Coulé, Aug. 17, 1904 (*Collins, Fernald & Pease*).

GRAY HERBARIUM.

EXPLANATION OF PLATE 60.—*Draba incana*; fig. 1, small plant, life-size; fig. 2, silique, with valve removed, $\times 4$. *D. stylaris*; fig. 3, portion of base, life-size; fig. 4, tip of fruiting raceme, life-size; fig. 5, silique, with valve removed, $\times 4$. *D. megasperma*; fig. 6, portion of base, life-size; fig. 7, tip of fruiting raceme, life-size; fig. 8, silique, with valve removed, $\times 4$. *D. arabisans*; fig. 9, portion of fruiting raceme, life-size. *D. arabisans*, var. *orthocarpa*; fig. 10, tip of fruiting raceme, life-size; fig. 11, silique, with valve removed, $\times 4$. *D. arabisans*, var. *canadensis*; fig. 12, fruiting raceme, life-size. *D. pycnosperma*; fig. 13, portion of base, life-size; fig. 14, fruiting raceme, life-size; fig. 15, silique, with valve removed, $\times 4$.